

# United States Patent [19]

Cobb, Jr.

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## [54] TOTALLY INTERNALLY REFLECTING THIN, FLEXIBLE FILM

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### Related U.S. Application Data

[63] Continuation of Ser. No. 218,087, Jul. 12, 1988, Pat. No. 4,906,070, which is a continuation of Ser. No. 903,655, Sep. 5, 1986, abandoned, which is a continuation-in-part of Ser. No. 799,869, Nov. 21, 1985, abandoned, and a continuation-in-part of Ser. No. 819,118, Jan. 15, 1986, abandoned.

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[52] U.S. Cl. .... 359/831; 359/528; 359/546  
[58] Field of Search ..... 350/286, 287, 276 R, 350/616, 176, 167, 103, 104, 106, 109; 362/32, 339, 337

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### [57] ABSTRACT

A thin, flexible film made of a transparent polymeric material including a structured surface and an opposite smooth surface, wherein light striking either surface, within certain angular ranges, is totally internally reflected. The structured surface includes a linear array of miniature substantially right angled isosceles prisms arranged side-by-side to form a plurality of peaks and grooves. In addition, the perpendicular sides of the prisms make an angle of approximately 45° with the smooth surface, and when the film is curled the smooth surface lies in a smooth continuous arcuate curve without materially affecting the performance of the film. Because of the film's flexibility and its ability to totally internally reflect light, it may be utilized in a variety of ways, for example, as a collector of solar energy or as a light conduit. The performance of the film may be manipulated to permit controlled light leakage.

8 Claims, 4 Drawing Sheets

